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REPORT OF PROCEEDINGS

OF THE

MICHIGAN STATE BOARD OF HEALTH.

REGULAR MEETING, JULY 13, 1886.



[108.]

The regular quarterly meeting of the Michigan State Board of Health was held in the State capitol in Lansing, July 13, 1886. The members present were as follows:—Hon. John Avery, M. D., President; Prof. V. C. Vaughan, M. D.; Prof. Henry F. Lyster, M. D.; Arthur Hazlewood, M. D.; J. H. Kellogg, M. D.; and Henry B. Baker, M. D., Secretary.

Considerable routine business was transacted and several papers presented. The following is an abstract of the proceedings:—

The subject of examination of plans for public buildings was discussed. Some public institutions have never submitted for examination by this Board plans for buildings constructed, although required to do so by law. Others, while submitting plans, in whole or in part, have not complied with the suggestions of the Board. Still others have willingly modified the first drafts relative to sewerage, heating and ventilating arrangements so as to make them conform to sanitary requirements. The Soldiers' Home, at Grand Rapids, was mentioned as a State charitable institution which did not submit its plans, and the ventilation and sewerage of which is reported to be of an extremely defective and unsatisfactory character, likely to injure the health of occupants. A committee was appointed to visit certain public institutions and learn their sanitary condition, and to what extent the recommendations of this Board have been carried out, with respect especially to sewerage and ventilation.

Dr. Hazlewood, as delegate to the St. Louis meeting of the American Medical Association, read a report of the public health work at that meeting.

Dr. Henry F. Lyster, of Detroit, presented an analysis of 500 deaths, at ages between 18 and 65, occurring in the Michigan Mutual Life Insurance Company during the first 18 years of its existence. The chief causes of death, in order of frequency, were lung consumption, pneumonia, typhoid fever, apoplexy, heart disease, cancer, Bright's disease, and acute miliary tuberculosis or quick consumption. The following statistics relate to the above-named diseases:

(See Table on next page.)

It will be observed that in the 98 deaths from consumption we have light

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weight and small expansion of chest correlated with considerably more than average height,—a fact which may be of occasional service to examiners in deciding upon risks, and which is of especial interest to all individuals of this character, who should take special pains to avoid predisposing causes of consumption, and especially to secure better nourishment and less waste, so as to make the weight nearer the normal average. The average age of the 47 typhoid fever decedents (38.5 years) is interesting as added proof, if any were necessary, that this largely preventable disease strikes down men in the prime of life, when they are physically and mentally at their best. The relatively large number of deaths from this preventable disease (nearly 10 per cent of all) also brings into clear relief the pecuniary interest of associations of this character and of the State at large in public health work, which by removing causes of disease aims directly at increased longevity and greater material prosperity.

DISEASE.	Number of Deaths.	Average Age.	Average Duration of Policy.	Average Height in feet and inches.	Average Weight in lbs.	Average Expansion of Chest. Inches.
Lung Consumption.....	98	40.17	4.23	5 11	139.45	2.98
Peri-pneumonia.....	62	43.45	3.64	5 9	142.24	3.55
Typhoid Fever.....	47	38.54	2.98	5 7.8	156.65	3.16
Apoplexy.....	39	51.10	5.50	5 8.5	163.90	3.25
Heart Disease.....	23	53.60	6.00	5 7.6	174.45	3.12
Cancer.....	22	48.90	4.76	5 7.3	160.38	3.02
Bright's Disease.....	16	54.50	7.85	5 8.14	166.35	3.32
Acute Miliary Tuberculosis.....	16	38.35	4.76	5 11.8	147.92	2.98

The remaining 177 deaths were distributed among 37 causes.

The proportion of deaths from the various types of disease were as follows:

Diseases of the nervous system.....	70
Diseases of the respiratory system.....	177
Diseases of the circulatory system.....	33
Diseases of the digestive system.....	44
Diseases of the urinary system.....	22
General diseases (including 34 accidents).....	154
Total.....	500

Dr. Lyster's paper will be printed in the Annual Report for 1886.

The subject of sanitary inspection of cities and villages was discussed at some length. It was believed that if health officers and local authorities can be induced more generally to make a careful house to house inspection and clean up, much good would result. With a view to stimulate such inspections, the secretary was directed to prepare a blank for use in such inspection, and distribute it to local health authorities.

Dr. Victor C. Vaughan, member of the State Board of Health, and its committee on poisons, explosives, etc., to whom had been referred the subject of the poisoning by ice cream at Lawton, made the following report:—

TYROTOXICON; ITS PRESENCE IN POISONOUS ICE CREAM; ITS DEVELOPMENT IN MILK; AND ITS PROBABLE RELATION TO CHOLERA INFANTUM AND KINDRED DISEASES.

BY VICTOR C. VAUGHAN, M. D., PH. D., PROFESSOR OF PHYSIOLOGICAL CHEMISTRY IN THE UNIVERSITY OF MICHIGAN, MEMBER OF THE STATE BOARD OF HEALTH.

About one year ago, and after two years of close investigation, the writer succeeded in isolating from some samples of cheese, which had produced alarming symptoms in many persons, a highly poisonous ptomaine, to which the name tyrotoxicon (cheese poison) was given. The effects of this poison were demonstrated repeatedly upon some of my students, who kindly offered themselves as subjects of experimentation, and upon myself. These were found to agree closely with those observed by the physicians who treated the persons made sick by eating of the cheese. There were reported to the Michigan State Board of Health about 300 cases. The most prominent symptoms were dryness and constriction of the fauces, nausea, retching, vomiting and purging.

The vomited matter was frothy and the stools watery. In some there were evidences of marked nervous depression. Although in many the condition seemed alarming, all finally recovered.

A report of the discovery of tyrotoxicon in cheese will be found in *Zeitschrift für physiologische Chemie*, B. X, Heft 2; also in the Annual Report of the Michigan State Board of Health, for the year 1885.

Last November a student brought to me a four ounce bottle partly filled with milk which had stood tightly closed with a glass stopper for about six months. From this I succeeded in isolating the same poison. It was recognized by its crystalline appearance and by its effect upon myself. It was presumed that this milk was normal in composition when first obtained; but of this we could not be certain.

I then put several gallons of normal milk in perfectly clean bottles with glass stoppers and allowed these to stand in my work room. From time to time a bottle was opened and the test for tyrotoxicon was made. These tests were followed by negative results, until about three months after the experiment was begun. I then succeeded in getting the poison from one of the bottles. The method of testing for it was as follows: The coagulated milk was filtered through heavy Swedish filter paper. The filtrate was colorless and decidedly acid in reaction. It was rendered feebly alkaline by the addition of potassium hydrate, then agitated with ether. After separation the ethereal layer was removed with a pipette, allowed to run through a dry filter paper to remove a flocculent, white substance which floated in it, and then allowed to evaporate spontaneously. If necessary this residue was dissolved in water and again extracted with ether. On the evaporation of the ether the tyrotoxicon was recognized by its crystalline appearance, by its odor, and by placing a small bit on the tongue. As the ether takes up some water, there is usually enough of the latter left after the spontaneous evaporation of the ether to hold the poison in solution, and in order to obtain the crystals this aqueous solution must be allowed to stand for some hours in vacuo over sulphuric acid.

From one half gallon of the milk there was obtained quite a concentrated aqueous solution of the poison after the spontaneous evaporation of the ether. Ten drops of this solution placed in the mouth of a small dog three weeks old caused, within a few minutes, frothing at the mouth, retching, the vomiting of

frothy fluid, muscular spasm over the abdomen, and after some hours watery stools. The next day the dog seemed to have partially recovered, but was unable to retain any food. This condition continuing for two or three days, the animal was killed with chloroform. No examination of the stomach was made.

It may be remarked here that I have elsewhere pointed out the necessity of using pure ether for these extractions, as some samples of ether contain an irritating, ptomaine-like substance.

June 13, 1886, I received from Dr. Henry B. Baker, Secretary of the Michigan State Board of Health, a pint bottle about two-thirds full of melted ice cream, with the request that I analyze it, as some 18 persons had been seriously affected by eating of it. Dr. Baker also sent some of the vanilla which had been used as flavoring. It was thought that the poison would be found in the vanilla, because some lemon ice cream furnished at the same gathering had not affected those who ate of it. As the readiest means of deciding this my assistant, Mr. Novie, and myself took at first 30 drops each of the vanilla extract. No ill effects following this, Mr. Novie took two teaspoonsful more, with no results. This settled the question of the poisonous nature of the vanilla more satisfactorily than could have been done by a chemical analysis.

We then added some distilled water to the cream and, after thorough agitation, filtered it. The filtrate was tested for tyrotoxicon by the method already given. The aqueous solution, after the spontaneous evaporation of the ether, was given to a cat. Within ten minutes the cat began to retch, and soon it vomited. This retching and vomiting continued for two hours, during which time the animal was under observation, and the next morning it was observed that it had passed several watery stools. After this, although the cat could walk about the room, it was unable to retain any food. Several times it was observed to lap a little milk, but on doing so it would immediately begin to retch and vomit. Even cold water produced this effect. This condition continuing, after three days the animal was placed under ether and its abdominal organs examined. We certainly expected to find marked inflammation of the stomach. But we really did find the stomach and small intestines filled with a frothy, serous fluid, such as had formed the vomited matter, and the mucous membrane very white and soft. There was not the slightest redness anywhere. The liver and other abdominal organs seemed to be normal.

It should be remarked that this cat was about two months old. Attention is called to this, because young animals are affected by this poison much more readily than older ones. It requires a comparatively large amount of the poison to cause any marked symptoms in an old cat.

After having made these experiments I received from Dr. R. C. Moffitt, of Lawton, Mich., the following letter:

"LAWTON, MICH., June 21, 1886.

"DEAR DOCTOR:—I understand from Prof. Chas. Lawton, of this place, that the cream sent to Lansing, for examination, has been forwarded to you, so I write to give you the particulars. About two hours after eating the cream every one was taken with severe vomiting, and after from one to six hours later with purging. The vomit was of a soapy character, and the stools watery and frothy. There was some griping of the stomach and abdomen, with severe occipital headache, excruciating back-ache and 'bone' pains all over, especially marked in the extremities. The vomiting lasted from two to three hours, then gradually subsided, and everybody felt stretchy, and yawned in spite of all resistance. The throats of all were oedematous. One or two were stupefied; others were cold and experienced some muscular spasms. A numb feeling, with dizziness and momentary loss of consciousness, was complained of by some. Temperature was normal, and pulse from 90 to 120. Tongue, dry and chapped. All were thirsty after the vomiting subsided, and called

for cold water, which was allowed in small quantities, with no bad results. After getting out no one of the victims was able to be in the hot sun for several days, and even yet (about ten days after the poisoning) the heat affects myself. I attended twelve persons, besides being sick myself, and all were affected in pretty much the same way. Several complain yet of inability to retain food on the stomach without distressing them. The man who made the cream took a teaspoonful of it, and he vomited the same as those who ate a whole dish, but not so often nor for so long a time. All are affected with an irresistible desire to sleep, which can scarcely be overcome. Even yet, some of us feel that drowsy condition, with occasional occipital headache. Yours fraternally,

"R. C. MOFFITT, M. D."

It will be seen from the above that the symptoms produced in the persons agree closely with those observed in the cat. Cases of poisoning from ice-cream are by no means rare, and I hope that those who have the opportunity will not fail to test for tyrotoxicon. In the report of the Brooklyn Board of Health for 1885, an instance is given of the poisoning of more than 100 persons from ice-cream, sent out from one restaurant. The chemist was unable to detect any mineral poison. The injurious results were attributed to the use of decomposed gelatin; but no gelatin of any kind was used in the Lawton cream. Other cases occurring in New York and Brooklyn have been attributed to the employment of artificially prepared vanilline for flavoring; but the vanilla extract used in the Lawton cream was not poisonous, as has been shown.

As I write this, I notice in the daily papers, the report of the fearful poisoning from ice-cream, near Leamington, N. J. The papers state that the poisonous substance is arsenic, but how this has been determined is not given. I suppose that arsenic has been named from the symptoms. If it be true that the cream was made from milk brought in by the quart or gallon, by those participating in the festivities, the chance of mixing some milk containing the germ, which must produce the poison, with the good and thus contaminating the whole, was as favorable as it could well be. Of course, if a chemical analysis shows the presence of arsenic, the question is settled; but in all similar instances chemical analysis has demonstrated the absence of mineral poisons.

The circumstances under which tyrotoxicon develops require farther study. As has been shown above it may develop in normal milk, kept in a clean bottle for three months; but it is evident that in some instances it appears much earlier. The production of the ptomaine is, in all probability, due either directly or indirectly, to the growth of some micro-organism. In the cheese Dr. Sternberg found a new micrococcus; but whether or not there is any relation between this organism and the poison remains to be determined. In the cheese, milk, and cream, in all of which I have found the poison, there was present more or less butyric acid, and it may be that there is some intimate relation between butyric acid fermentation and the production of the poison. Some years ago Selmi obtained a ptomaine which resembles coniine, and pointed out that it might be formed by the action of butyric acid on ammonia, thus: $2C_4H_8O_2 + NH_3 - 2H_2O = C_8H_{16}N$.
(Butyric Acid.) (Ammonia.) (Coniine.)

or thus: $2C_4H_8O_2 + NH_3 + 2H - 4H_2O = C_8H_{14}N$.

In like manner other fatty acids may react with decomposing nitrogenous substances, forming alkaloidal bodies. Tyrotoxicon has no special resemblance, so far as is known, with coniine, but the possibility of these alkaloidal substances being formed in this way is worthy of mention. T. Lauder Brunton, in referring to the writer's discovery of tyrotoxicon, states that from the action of the substance he would infer the presence of two poisons. This is altogether possible. The writer has not been able to obtain the poison, as yet,

in quantities sufficient to enable him to make an ultimate analysis of it. But that it is a chemical body produced by fermentation there can be no doubt.

If there be any doubt about the poison being produced by fermentation, the following experiment would seem to clear it up.

June 26, I took two samples, of one pint each, from a bottle of milk which had already undergone the lactic acid fermentation. These samples were placed in clean glass graduates. To one, a piece of the solid portion of the poisonous custard, about the size of a filbert, and which had been washed with distilled water, was added. To the other no addition was made. These samples stood side by side for forty-eight hours. Both were then tested for tyrotoxicon. The one to which no addition was made gave no crystals, no odor, and when given to a cat produced no effect. The one to which the addition had been made yielded crystals which had the odor of tyrotoxicon, and which, when given to a very large old cat, produced frothing at the mouth and retching, but no vomiting or diarrhoea, and the next day the animal was able to eat food and seemed to have recovered. I am quite certain that had this been administered to a young animal the result would have been more marked.

It is well known that milk, while undergoing the lactic acid fermentation, does not possess any such poisonous properties as those belonging to tyrotoxicon. There is no evidence, then, that the poison is connected in any way with the ordinary decomposition of milk. The following extracts from a letter just received from the maker of the Lawton cream shows that the attention given to the milk and vessels was all that could be desired:

"The milk of which the cream was made was fresh and sweet morning's milk, only reserving with it the cream of the milk of the night before from the same cows. The milk is kept in a cool, clean milk cellar. The custard was made about noon that day and immediately afterwards the process of freezing was begun. The vessels were all thoroughly cleaned. There was no possibility of any impurities adhering to them, for they were scalded, wiped and dried before being used. The only ingredients used were the milk, cream, eggs, sugar (best granulated) and the flavoring."

"The lemon cream was frozen first, then taken out, put into the packers, and packed solid with ice and salt. Then the vanilla cream was frozen in the same manner. I used the best Jennings's extract, about the usual quantity, not in excess. The cream was eaten in the evening by many people of the village. All of those who ate of the vanilla cream were made sick, and none of those who ate of the lemon cream suffered any inconvenience."

"Now, the milk was the same in both, milked from the same cows the same morning that the cream was made, so that there was no difference in the custard used in making the vanilla cream and the lemon cream, but it turned out that the one made people sick and the other did not."

"We have continued making cream since in the same manner without the least change of the ingredients or the apparatus, except we have not used vanilla extract, but lemon and pine-apple, and it has been freely eaten and no one has been made sick by it."

"Clearly in my mind the milk does not account for the trouble. One thing further: of course the cream which you examined has been made since the ninth day of June, and may have undergone changes which would result in generating the poison referred to in the papers [certain newspaper accounts of the finding of the poison], and which would not have been found in the cream had it been examined when fresh."

"If there is anything farther that I can furnish you in regard to facts or circumstances in connection with this ice-cream, I will be willing at any and all times to give the fullest information possible. Hoping to receive the correct analysis soon, I remain yours respectfully,

"J. W. JOHNSON."

That the poison which I found in the cream was the same as that which affected the people can not be doubted after comparing the symptoms produced in the cat with those observed by Dr. Moffitt, and as has been stated the experiment on the cat was made before I received the letter from Dr. Moffitt. The cream was made on the 9th of June, and the poison separated on the 14th.

I wrote to Mr. Johnson asking several questions, which he has kindly and fully answered. As the nature of the questions is shown in the answers, I will simply give the answers:

"(1.) The milk from all the cows was mixed together in the making of the custard."

"(2.) The custard for the lemon and vanilla was all one custard; made and mixed before the extracts were put in"

"(3.) We had previously used the same brands of extracts (Jennings's best), both lemon and vanilla, with no bad results."

"(4.) The food of the cows in the morning and evening consists of oats and corn, ground together and fed dry, with clover hay. I have never seen anything suspicious in the pasture or food. There is a running stream of water, coming from a spring, in the pasture. There is plenty of shade. At evening the cows are driven from the pasture and placed in the stable or yard, according to the season. The stable and yard are open for inspection at any time. My residence is in the center of the village, and the board of health would not allow me to stable and yard my cows there if there were any bad odors during the summer."

"(6.) The teats are thoroughly washed before each milking."

After receiving the above details concerning the making of the cream, the following experiment was made:

July 8. To one quart of night's milk a piece of the solid portion of the Lawton cream, about the size of a filbert, was added. This residue had been left in the filter paper ever since the analysis of the poisonous cream, June 14, and it was on June 8 that the first milk for the preparation of the Lawton cream was collected. This dried and hardened lump was crumbled into the milk, which was placed in a clean tin pan and set in a cool cellar. July 9, to a quart of morning's milk, another small bit of the infected material was added, and this milk was also placed in the cellar. At 1 P. M. both portions of milk were poured into a clean earthenware jar, and four fresh eggs beaten, and one pint of granulated sugar were added. The whole was thoroughly agitated, then allowed to stand at the temperature of the room until 4 P. M., when it was placed in the ice-box of a refrigerator, surrounded by ice and here kept until 7 A. M., the next morning, July 10. Then three ounces of the custard was stirred up with distilled water, filtered, the filtrate rendered alkaline and agitated with ether. The residue on the evaporation of the ether was dissolved in a little water and given to a kitten about two months old. Immediately the kitten manifested the symptoms of poisoning by tyrotoxicon, which have already been described. I began the analysis of this custard in the morning before having my breakfast, and getting a little on my finger in carrying the jar, I tasted of it. Within a very few minutes I was nauseated, and ten minutes after taking it I vomited. The prompt action of so small a quantity was probably due to the condition of my stomach. At 2 P. M. of the same day I took one teaspoonful of the custard. Within thirty minutes there was marked nausea and some violent retching, but no vomiting. At 3 P. M. the symptoms having abated, I took a tablespoonful more of the custard. At about 3 : 30, I began to vomit freely. The nausea continued for about an hour. After this there would be passing sensations of sickness. At 8 P. M., while visiting a patient, I was taken very suddenly and sharply with nausea and gripping pains in the abdomen. I again vomited and had one watery stool. After this there was no farther trouble. The occipital headache, mentioned by Dr. Moffitt in his letter, was very marked for some hours after taking the custard. It consisted of sharp, lancinating pains which were confined wholly to the occiput. The nausea was peculiar. I cannot say that there was pain in the stomach. A sickening taste would be felt in the mouth and a peculiar, very

sickening odor, which I recognized as that of the isolated poison, would intensify the nausea. The throat and mouth seemed filled with a sticky, tenacious mucus. In short, the effects on these parts resembled those which I have experienced from an over-dose of atropia.

I think that this experiment explains the poisonous nature of the vanilla cream. The fermentation going on in the custard, and probably begun in the milk, was arrested in that part flavored with lemon by the freezing which was begun immediately. But while the lemon cream was being frozen that part of the custard which was to be made into vanilla cream continued to ferment, and before the freezing process was begun enough of the poison was generated to seriously affect those eating of it.

It should be remarked that in the custard which I made there was nothing peculiar in the taste. It was sweet and pleasant. But while it was not at all acid to the taste, it gave a decidedly acid reaction as tested by litmus, and was not amphoteric in reaction, as cow's milk frequently is.

It is possible that the presence of the large amount of albumen in the custard, from the eggs, hastened the fermentation. I believe that makers of cheese have found by experience that a large amount of albumen in cheese renders decomposition more easy.

How the special germ which produces the poison found its way into the Lawton cream I cannot say; but that it was either present in the milk or was contained in the eggs used, I think cannot now be doubted.

TYROTOXICON, AND CHOLERA INFANTUM.

I desire to call attention to the great similarity between symptoms of poisoning by tyrotoxicon, and those of cholera infantum. I am aware of the fact that the term "cholera infantum" is used by many in referring to almost any summer diarrhoea of children; but restricting the term to the violent choleraic diarrhoea, as is done by Smith and other best authorities on the subject, we shall find its similarity to poisoning by tyrotoxicon very marked.

The suddenness and violence of the attack, the nausea and vomiting without marked tenderness of the abdomen, the character of the stools, the great thirst, the severe pain in the back of the head, the nervous prostration, and the tendency to deep sleep, are all observed in both. Again, the white, soggy appearance of the mucous membrane of the stomach of the cat corresponds exactly with observations in children after death from cholera infantum. Cholera infantum, as is stated by Smith, "is a disease of the summer months; and, with exceptional cases, of the cities." Thus, the disease occurs at a time when decomposition of milk takes place most readily. It occurs at places where absolutely fresh milk often cannot be obtained. It is most prevalent among classes of people whose surroundings are most favorable to fermentative changes. It is most certainly fatal at an age when there is the greatest dependence upon milk as a food, and when, on account of the rapid development of intestinal follicles, there is the greatest susceptibility to the action of an irritant poison, and when irritative and nervous fevers are most easily induced. If all these facts be taken into consideration, along with the experiments which have been detailed, and which show the readiness with which the poison can be generated, it will certainly seem at least probable to any one that tyrotoxicon may be a cause of cholera infantum. A little dried milk formed along the seam of a tin pail, or a rubber nipple, tube or nursing bottle not thoroughly cleansed, may be the means of generating, in a large quantity of milk, enough of the poison to ren-

der it highly harmful to children. The high temperature observed in children with cholera infantum, and which has not been observed in adults poisoned by tyrotoxin, may be caused by the continued production of the poison in the child's intestine, by the continued administration of milk, and by the greater susceptibility of the sympathetic nervous system in children.

If this causal relation does exist between tyrotoxin and cholera infantum, a knowledge of it will aid us, not only in the preventive, but in the curative, treatment of the disease. The first thing to do in the treatment of the disease is to absolutely prohibit the further administration of milk, either good or bad, because the fermentation going on in the intestine would simply be fed by the giving of more milk, even if that milk be of unquestionable purity. I would suggest that some meat or rice preparation be used for food, though experience will soon give us valuable information on this point.

A germ which forms a poisonous ptomaine by its growth in milk may be wholly harmless when placed in a meat or rice preparation.

Secondly, mild antacids should be administered, because the poison, so far as our information goes, is produced only in acid solutions. The great value of the chalk mixture in the treatment of the disease is well known.

Thirdly, theoretically at least, the employment of small doses of some disinfectant would be of benefit. I find that there is considerable difference of opinion in the profession as to the use of small doses of calomel in this disease.

Fourthly, the use of opium in some form is consistent with the theory.

And lastly, the administration of stimulants, brandy and ammonia, to counteract the depressing effects of the poison, already formed and absorbed, should be practiced.

All of these, save the first recommendation, have been practiced in the treatment of the disease empirically; but the first—absolute discontinuance of the use of milk—I regard as of prime importance.

Of course, it will be understood that attention to securing fresh air, and to other hygienic measures, is also desirable.

It is altogether probable that an amount of the poison which would escape chemical detection, might be sufficient to produce poisonous effects in children.

ANN ARBOR, July 12, 1886.

Dr. Vaughan said that the pieces of poisonous beef that had been sent to him from Ionia and Whitehall were not large enough for the purposes of an investigation. The Secretary of the Board had endeavored to secure larger pieces.

It was decided to print ten thousand copies of a revised document on the restriction and prevention of scarlet fever, and five thousand on the restriction and prevention of small-pox, previous editions being exhausted.

A committee was appointed to visit Negaunee to inspect the sanitary condition of the city, and its water-supply, and to consider the feasibility of holding a sanitary convention there.

Two thousand copies of the proceedings of the Kalamazoo Sanitary Convention were ordered to be printed.

The Secretary was also directed to print a revised list of the health officers of the State for 1886-7, about 1,400 in number.

The Secretary was directed to prepare and publish a circular letter on glanders, for use where the disease occurs.

A petition, signed by citizens of Big Rapids, praying for a sanitary convention at that place, was presented and referred to a committee for action.

Delegates were appointed to attend the Toronto meeting of the American Public Health Association, and the conference of State Boards of Health, at the same time and place.

The Secretary read a letter from a health officer, stating that whereas formerly he had met with much opposition in enforcing necessary restriction in cases of communicable diseases, he now found the people ready and willing to assist him in his work. This change of sentiment he attributed largely to the educational influence of the State Board of Health, particularly to the wide and careful distribution among the people of pamphlets on the dangerous communicable diseases.

Dr. J. H. Kellogg, of Battle Creek, made a report on the sanitary condition of the court house and jail adjoining, at Stanton, Mich., which he had recently visited, and carefully examined, at the request of the Board of Supervisors of Montcalm county. He found the sewerage and ventilation in an extremely defective condition. In brief, the condition is as follows: The court house and jail (one building) is on a hill in the village and was built not many years since. The ventilation is by means of one large foul-air shaft (6x6 feet) heated by a smoke-stack which passes up through it. All the rooms in the court house and jail, including the sheriff's quarters, open into this one shaft, a most defective method, one of the canons of modern ventilation being the provision, whenever possible, of a separate foul-air shaft for each room. When the windows are closed and the smoke-stack is heated, as in cold weather, the ventilation is probably very fair, the current being then upward out of the rooms; but at other times, with no heat in the foul-air shaft, and with a window open, the air currents are often reversed. At the time of his visit the foul air was blowing down the shafts strongly into the various rooms of the building, and those living and working there stated this to be a common occurrence. The defective sewerage system adds to the evil effects already noted; because the soil pipe from the cess-pools is carried up the main foul-air shaft and *opens into it about three feet above the second floor of the building*, so that whenever the air currents in the shaft are downward the mephitic odors of the decomposing excreta are driven into all parts of the building. The stench in the jail, living rooms, and county offices was very strong at the time of the examination. The sheriff's family and others occupying the rooms declared that the odor was at times so vile as to be almost unendurable, and some rooms had been abandoned on this account. The arrangements for sewage disposal are very defective. The traps are under the floor, out of easy reach, and are of defective character, allowing the free passage of sewer air. The loosely jointed soil-pipe leads into a cess-pool back of the jail. This cess-pool, holding several thousand gallons, has no bottom and its sides are not laid in cement. Another overflow cess-pool, a short distance further down the hill, has been constructed more recently. The old cess-pool has frequently overflowed, the sewage running down the hillside and across a citizen's garden. The path of the sewage down the street could be traced many rods by the rank vegetation. It should be added that there are wells around the foot of this hill. At the time of the visit there were several wagon loads of sewage on the ground beneath the building. Owing to their defective character, and to the carelessness of prisoners, the clogging of the pipes was of frequent occurrence. An attempt to blow out the obstructions by steam had resulted in filling the building with foul odors and liquid sewage. The sheriff's family had suffered much from ill health apparently attributable to this bad sewerage, and there was a case of malignant diphtheria in the jail at the time of the examination.

Dr. Kellogg recommended the construction, as far as practicable, of separate foul-air ducts for each room; the removal of the accumulated sewage; the re-building of the soil-pipe and its extension to above the roof of the building; the re-placing of all traps in positions above the floors where they can be readily examined; the construction of a catch-basin outside the building for intercepting rags and other foreign bodies thrown into the water-closets by prisoners; the provision of separate pipes for the removal of slops and waste water, and finally the removal of the entire sewage by means of a tight sewer to a distance of about 80 rods, into a stream, or what seemed better, owing to the small size of the stream, into a water-tight cess-pool to be built back of the jail, somewhat farther down the hill than the present ones, this cess-pool to have a ventilating shaft, and the trap of the soil-pipe opening into it to be also provided with an air shaft. The side hill is sufficiently sloping to allow of the frequent removal of the contents of such a cess-pool by means of a lateral pipe without necessity of resorting to pumping.

The Secretary presented his quarterly report of work in the office as follows:

SECRETARY'S QUARTERLY REPORT OF WORK IN THE OFFICE OF THE STATE
BOARD OF HEALTH FOR QUARTER ENDING JULY 13, 1886.

The Annual Report for 1884 has been sent to persons named in lists prepared by Drs. Kellogg, Hazlewood, and Baker, to librarians, to Secretaries of State Medical Societies and others in exchange for documents, to sanitarians, and to health officers of cities and villages. Not many copies remain to be distributed.

About 6,000 copies of circulars on the prevention and restriction of the dangerous communicable diseases have been sent to localities in Michigan where communicable diseases were reported to be present.

Returns of names and addresses of health officers in Michigan for 1886-7 have been received and filed, and a list of such health officers has been made ready for printing.

Announcements and programs of the Kalamazoo Convention were sent out, and I attended the Convention, distributed documents, and did what I could to promote its objects.

I made a visit to Coldwater on June 17 for the purpose of meeting a citizens' committee on Sanitary Convention. The Convention was fixed for Sept. 23 and 24, but has since been changed to Sept. 9 and 10. Announcements of the proposed Coldwater Convention have been printed and distributed. Much work has been done in the way of supplying authors of papers to be read before such conventions with literature from the library of the Board bearing on their subjects.

The meteorological tables for the year 1885, to be printed in the report for 1886, are nearly completed.

The usual distribution of ozone test-paper to each of 22 meteorological observers for the State Board of Health was made June 14. A new supply of ozone test-paper has been ordered and received from J. H. Long, M. D., of Chicago Medical College, Chicago, Ill.

A copy of the record of the meteorological observations taken at this office has been sent each month to the chief signal officer at Washington, D. C., as well as reports of all thunder-storms. A careful report of the tornado near Lansing, May 14, was sent to the chief signal officer. One wet bulb thermometer, No. 8248, has been sent to Dr. J. H. Kellogg to take place of one accidentally broken.

Printing on the Report of the Board for 1885 has been pushed as rapidly as possible.

A sample of pressed beef that had caused sickness at Ionia was received from Dr. S. V. Romig and forwarded to Dr. Vaughan, as well as a sample from Whitehall. A quantity of the ice cream that made 19 persons sick in Lawton, Van Buren Co., was received from the health officer of that village and forwarded to Dr. Vaughan, as well as a bottle of the vanilla extract, and a small quantity of the extract actually used in that instance.

There have been three outbreaks of small-pox, one case at Bell Branch, Wayne county, two cases in Detroit, and seven cases in Stalwart, Chippewa county. The one in Bell Branch was soon recognized and the disease was not allowed, by the intelligent health officer, Dr. T. H. Matthews, to spread. The outbreak in Detroit was in a German family named Brand that had just returned from a visit in Germany. The child was taken sick soon after the return (about two weeks), but the attending physician did not recognize the disease to be small-pox for several days, when Health Officer Wight took sanitary charge of the case. Large numbers of people may have been exposed. The father is said to have been taken sick with the disease also. The first case at Stalwart, Chippewa county, was Alexander Montgomery, who came from Harrison, Canada, taking the Canadian steamer Athabasca at Owen Sound, and landing at Sault Ste. Marie about May 20, and went to the house of his sister in Stalwart, whose four children contracted the disease from him. This office received early information from the attending physician, Dr. A. E. Bacon, of Sault Ste. Marie, and documents were immediately sent to him, to a neighbor of the family in which the disease was, and to the supervisor of the township, as well as to the health authorities of the adjoining township of Detour. Two nurses were employed to take charge of the family, and no spread of the disease from the house has been reported. Two deaths have occurred in this outbreak. Montgomery may have contracted the disease on board the Athabasca, as it is rumored that that vessel dropped two men suffering with the disease at Owen Sound.

During the quarter I went, as a delegate of the Board, to the Sanitary Convention held in Philadelphia, under the auspices of the Pennsylvania State Board of Health. While in Philadelphia I read a paper entitled "Causation of Pneumonia" before the American Climatological Association. The paper was founded upon statistical compilations made in this office, and which seem to demonstrate the cause, and supply hints for the prevention of that important disease.

I also attended a part of the meeting of the Michigan State Medical Society at Jackson, Dr. Tyler, the regularly-elected delegate of the Board, having written me that he could not be there, and requesting me to go in his place. A paper by Dr. Wight suggested a change in the law, doing away with local boards of health and substituting county boards.

During the past three months, the correspondence of the office, excluding postal cards, covers about seven hundred pages of the letter-book. The correspondence was largely in regard to outbreaks of communicable diseases, replies to inquirers in regard to powers and duties of health officers and local boards of health, and interpretations of other public health laws.

The compilation of the card reports for 1885 is nearly completed, ready for making up the tables and exhibits for the article on "Weekly Reports of Diseases," for the report for 1886.

SICKNESS AND METEOROLOGICAL CONDITIONS IN THE SECOND QUARTER OF 1886,
COMPARED WITH THE FIRST QUARTER OF 1886, AND WITH THE AVERAGE
SECOND QUARTER IN THE EIGHT YEARS 1879-1886.

Contagious Diseases.

Compared with the preceding quarter (January, February and March), reports received from all sources show the number of places at which diphtheria is reported to have decreased by an average of eight places per month, scarlet fever to have decreased by an average of six places per month, measles to have increased seven places per month, typhoid fever to have decreased six places per month, and small-pox to have increased one place per month in the second quarter of 1886.

Sickness from all Causes.

A comparison of the meteorological conditions of the second quarter of 1886, with the meteorological conditions of the first quarter, shows the temperature to have been much higher, the absolute humidity, and the day and the night ozone to have been much more, and the relative humidity less, in the second quarter than in the first quarter of 1886.

Compared with the preceding quarter (January, February and March), the reports received from regular observers indicate a marked increase of diarrhoea and cholera-morbus, and a marked decrease of pneumonia, tonsilitis, bronchitis, and influenza in the second quarter of 1886.

A comparison of the meteorological conditions of the second quarter of 1886, with the average of the corresponding quarters in the eight years, 1879-1886, shows that in 1886 the temperature was slightly higher, the absolute humidity was slightly more, the relative humidity and the day and the night ozone were more than in the average second quarter of the preceding eight years.

Compared with the average for the corresponding quarter in the eight years, 1879-1886, the reports received from regular observers indicate that intermittent fever, measles, remittent fever, pneumonia, diphtheria, bronchitis, and consumption of lungs, were less prevalent in the second quarter of 1886 ; and that there was no disease that was more than usually prevalent in that quarter.

HENRY B. BAKER,
Secretary.

